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RELATIONSHIPS AND TAXONOMY OF *IPOMOEA VARIABILIS* (CONVOLVULACEAE)

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ABSTRACT

Since at least the early 1900s, two species of *Ipomoea* have been confused—*I. variabilis* (Schltdl. & Cham.) Choisy and *I. mitchellae* Standl. Since Homer D. House considered *I. variabilis* to be a member of *Ipomoea* sect. *Pharbitis,* many subsequent students of the family have followed that disposition. We were able to study the types of both names and discovered that the disposition by House and others is incorrect. *Ipomoea variabilis* is a synonym of *I. batatas* (L.) Lam. and the correct name for specimens that have been identified conventionally as *I. variabilis* should be recognized as *I. mitchellae* of *Ipomoea* ser. *Exogonium.* We discuss the misunderstanding, cite protologues, list types, and indicate the proper relationships of these two species based on both morphological and molecular genetic studies.

House (1908:207) used the name *Ipomoea variabilis* (Schltdl. & Cham.) Choisy for plants with "sepals 3–5 mm wide x 14–18 mm long, hirsute with spreading hairs at the base and corollas 5–6 cm long," and described the flowers as blue or purple. Although House cited the correct synonymy, it is clear he did not compare his plants with the original description of *Convolvulus variabilis* or with Choisy's combination in *Ipomoea.* Schlechtendal and Chamisso (1830: 117) clearly stated that the plants have "sepala elliptica, breviter mucronato-acuminata ... Corolla magna, rosea, 1.5 poll. fere longa (sepals elliptic, short mucronate-acuminate ... Corolla large, pink, usually 1.5 inches long). Choisy (1845:383) quoted Schlechtendal and Chamisso (1830) almost verbatim. House (1908: 207) also cited Hallier (1899: 411) but ignored the fact that Hallier had placed *I. variabilis* in "§ Batatas," which he conceived in a strict sense at that point in time, which is consistent with our modern concept of the sweet potato complex [*Ipomoea* ser. *Batatas* (Choisy) D.F. Austin]. Instead, House placed *I. variabilis* in *Ipomoea* subsect. *Tyrianthinae* within sect. *Pharbitis,* owing ostensibly to the hirsute and spreading hairs at the base of his specimen's sepals (Mexico: Veracruz. Ano 1853, *F. Müller s.n.* NY!), a feature that is decidedly inconsistent with the type of *Convolvulus variabilis* Choisy.

When McDonald (1994) published the Convolvulaceae for the *Flora de Veracruz,* one of the few types that he did not see was that of *Convolvulus variabilis*. At that time, McDonald assumed the holotype was in LE, where Chamisso's types are located, but travel options and political conditions did not allow for a visit to the herbarium. It is now clear that many of the types used by Schlechtendal and Chamisso are in the herbarium at Martin Luther University of Halle-Wittenberg (HAL), where Schlechtendal was professor of botany and director of the Botanical Gardens from

1833 until his death in 1866 (Hoffmann 1998; Kesting & Hoffmann 2000; Meyers Konversations-lexikon 1885-1892:504; Rainer 2003).

McDonald adopted the name *Ipomoea variabilis* on the basis of Homer House's perceptions and description of the binomial, as well as those of Standley and Williams (1970: 39), who demoted the name to varietal status in a broad concept of *Ipomoea indica* (Burm.) Merr., a member of *Ipomoea* ser. *Pharbitis* (Choisy) Benth. Following McDonald's (1994: 129) interpretation, we have used the binomial *I. variabilis* (Austin et al. 2012: 314; Felger et al. 2012: 500). Most specimens in herbaria are now annotated with that name.

George Staples recently pointed out to us that an image of *Convolvulus variabilis* at HAL is now available at Global Plants (2014). We have examined the image of that sheet, annotated by both Chamisso and Schlechtendal, and now realize that Choisy (1845: 383) and Hallier (1899: 411) were correct in aligning the species in *Ipomoea* series *Batatas*. Our previous interpretation of the binomial *I. variabilis* as a plant similar to *I. indica* (Burm.) Merr. is incorrect, because the isotype is actually *I. batatas* (L.) Lam.

Below we provide the proper names and relationships for the two species that have been misinterpreted by many people, including us.

1. **Ipomoea mitchellae** Standl., Publ. Field Mus. Nat. Hist., Bot. Ser. 8: 39. 1930. **TYPE: HONDURAS.** Atlántida: wet thicket, La Fragua, alt. 20 m, 7 Dec. 1927, *Standley 52658* (holotype: F0054855F!; isotype: US00111423!).

While this species is widely distributed in Mesoamerica, from Veracruz and Oaxaca, Mexico south to Costa Rica (Austin et al. 2012: 314; Hammel 2010: 112), this is the oldest name available for this distinctive taxon. Austin long interpreted these plants as part of a variable *Ipomoea indica* (Austin 1986: 358, Austin & Huáman 1996: 37), much as Standley and Williams (1970) and many other curators. Although Standley was wrong in suggesting *I. mitchellae* was allied with *I. purpurea* (L.) Lam., he was correct in recognizing this species' close affinities with *I. meyeri* (Spreng.) G. Don. Superficially, *I. mitchellae* and *I. meyeri* are both similar to *I. indica* and other members of *Ipomoea* ser. *Pharbitis*, but that is due to convergence in sepal morphology. Independent phylogenetic analyses indicate these sister species are nested within *Ipomoea* sect. *Exogonium* (McDonald & Mabry 1992: 252; McDonald et al. 2011: 168).

2. **Ipomoea batatas** (L.) Lam., Tabl. Encycl. 1: 465. 1793.
Convolvulus variabilis Schltdl. & Cham., Linnaea 5: 116. 1830. *Ipomoea variabilis* (Schltdl. & Cham.) Choisy in DC., Prodr. 9: 383. 1845. *Ipomoea indica* var. *variabilis* (Schltdl. & Cham.) L.O. Williams, Fieldiana, Botany 32: 191. 1970. **TYPE: MEXICO. Veracruz.** Hacienda de la Laguna, *Schiede & Deppe s.n.* "219" [1828-09] (holotype: HAL0037741 digital image!; isotype?: LE, n.v., cf. Stafleu et al. 1976: 482).

When Choisy (1845: 383) made the combination with *Ipomoea* he cited the basionym and ended the treatment with a dagger symbol (†). It is not clear if that symbol was used to mean that he had not seen original material or if he thought it had been destroyed. Probably, he meant that he was using only the protologue and saw no specimens. He commented that the species was "*Affinis I. ramoni*," which is now regarded as a synonym of *I. trifida* (Kunth) G. Don (*Ipomoea* series *Batatas*). In that suggestion, Choisy was correct.

After Hallier (1899: 411), Carlos O'Donell was one of few modern botanists to correctly maintain *Ipomoea variabilis* in the Batatas complex. O'Donell annotated the holotype of *I. purpusii* House (*Purpus 2213*, NY!) as *I. variabilis* in 1950. Subsequently, Rosangela Simão-Bianchini saw

the sheet in 1996 and annotated it as *I. batatas*. After having seen the type of *C. variabilis* in HAL, we now realize that both annotations are correct, but *I. batatas* has priority.

However, these plants are not the well known hexaploid *Ipomoea batatas* of cultivation but are the long misunderstood tetraploid wild relatives of the crop. Paul Standley, for example, consistently misidentified specimens of the tetraploid as *I. triloba* L. (cf. comments in Austin 1978: 128). That tetraploid variant has been discussed by Austin et al. (1993) and Bohac et al. (1993).

Figure 1. Segment of the type specimen of *Ipomoea variabilis* at HAL showing the sepals and corolla base. Note ovate-mucronate sepal apices and dense pubescence.

Figure 2. Segment of type specimen of *Ipomoea mitchellae* at F, showing the sepals. Note the elongate, acuminate sepals with spreading pubescence.

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